

NAME:

DATE:

Unit-2 Mastery Assessment (version 644)

Question 1 (10 points)

Let f represent a function. If $f[21] = 46$, then there exists a knowable solution to the equation below.

$$y = \frac{f\left[\frac{x+20}{3}\right] + 14}{10}$$

Find the solution.

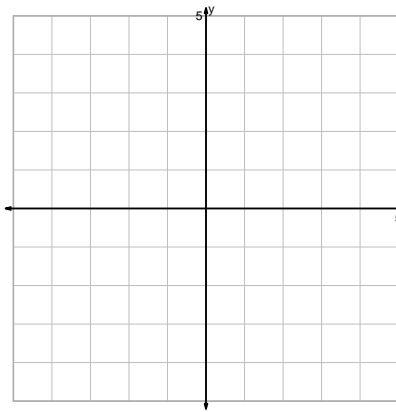
$$x =$$

$$y =$$

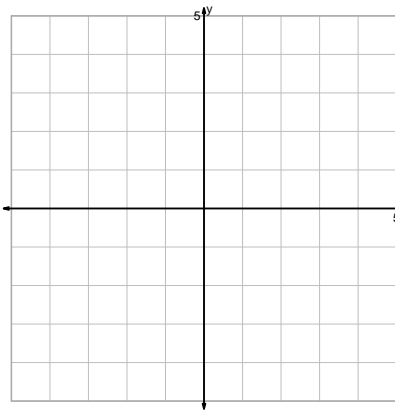
Question 2 (20 points)

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

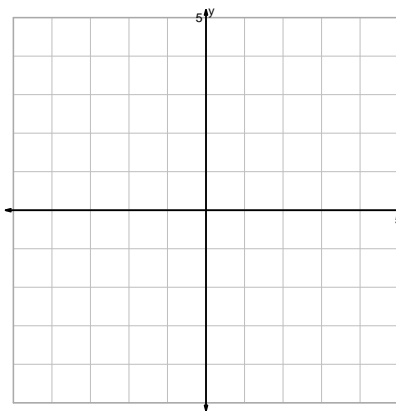
$$y = \left(\frac{x}{2}\right)^2$$



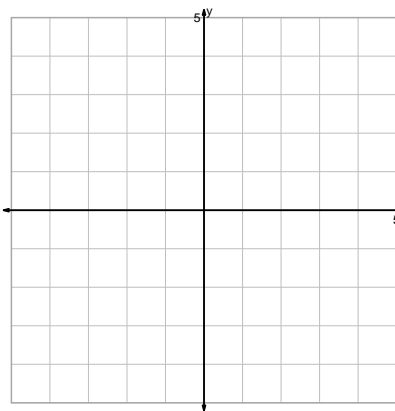
$$y = \frac{2^x}{2}$$



$$y = \sqrt[3]{x+2}$$

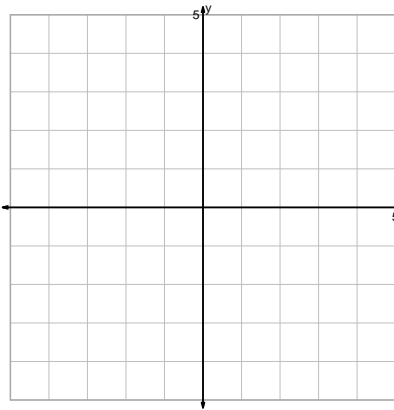


$$y = x^3 - 2$$

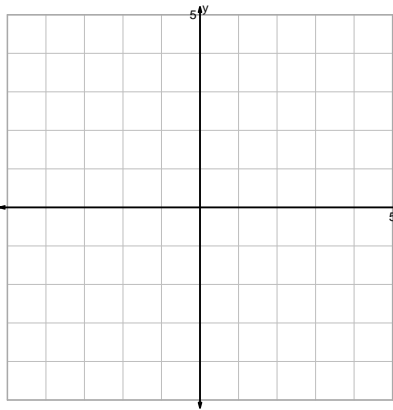


Question 2 continued...

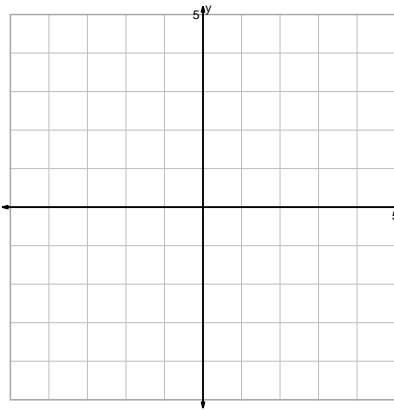
$$y = \sqrt[3]{x} + 2$$



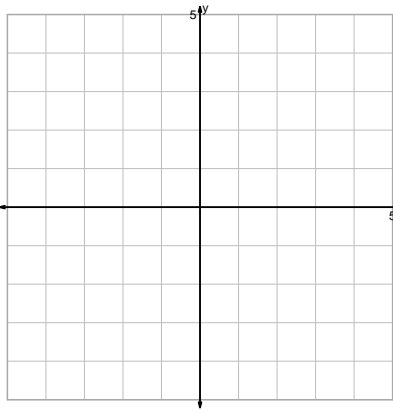
$$y = 2^{-x}$$



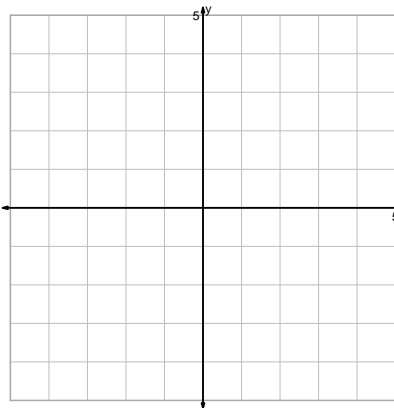
$$y = -\sqrt{x}$$



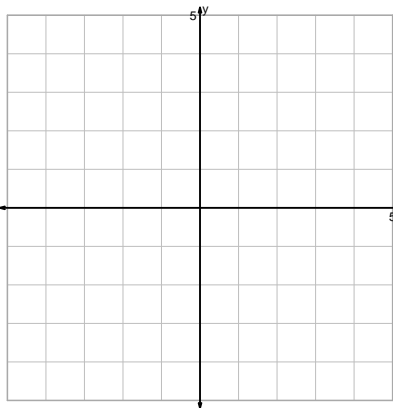
$$y = (2x)^3$$



$$y = (x - 2)^2$$

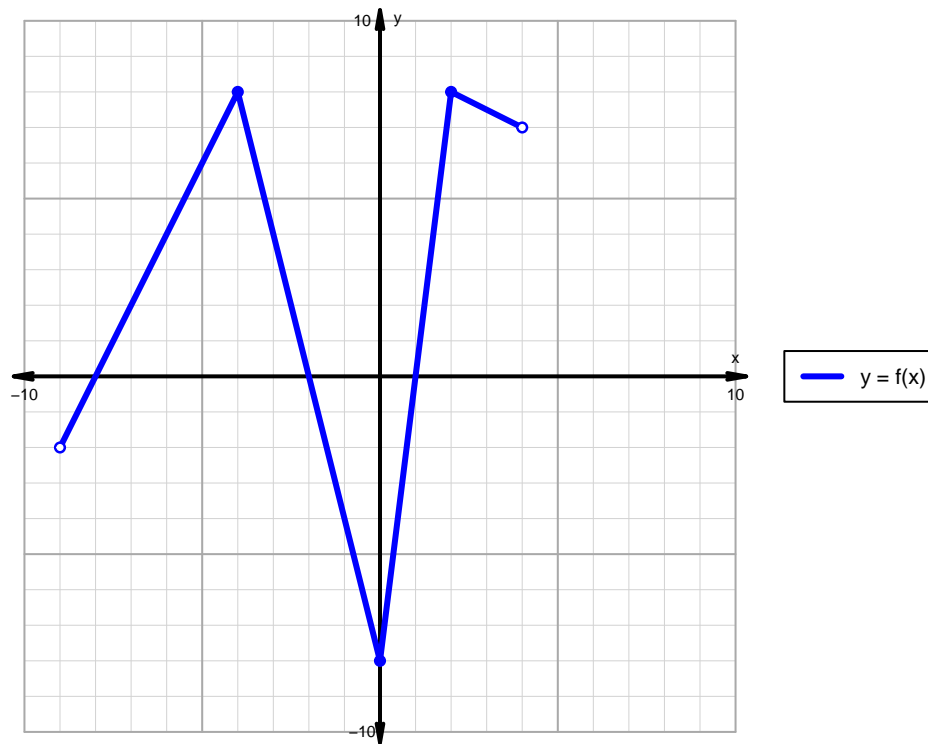


$$y = 2 \cdot \log_2(x)$$



Question 3 (20 points)

A function is graphed below.



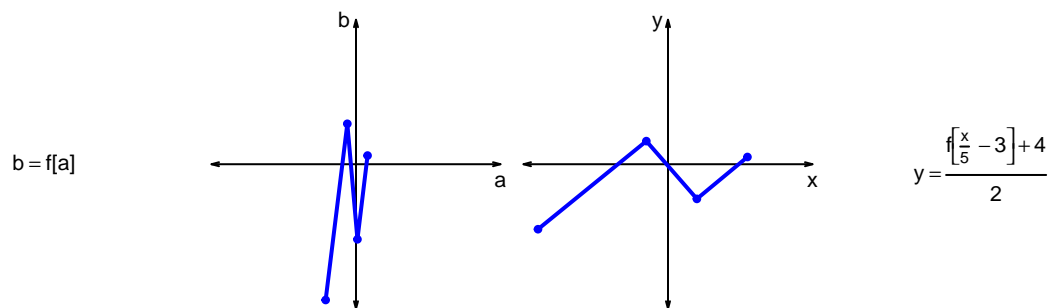
Indicate the following intervals using interval notation.

| Feature | Where |
|------------|-------|
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |
| Domain | |
| Range | |

Question 4 (20 points)

Let f represent a function. The curves $b = f[a]$ and $y = \frac{f[\frac{x}{5}-3]+4}{2}$ are represented below in a table and on graphs.

| a | b | x | y |
|-----|-----|-----|-----|
| -21 | -94 | -90 | -45 |
| -6 | 28 | -15 | 16 |
| 1 | -52 | 20 | -24 |
| 8 | 6 | 55 | 5 |



- a. Write formulas for calculating x from a and calculating y from b . (Or, write the coordinate transformation formula.)

- b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = \frac{f[\frac{x}{5}-3]+4}{2}$?

Question 5 (10 points)

A parent square-root function is transformed in the following ways:

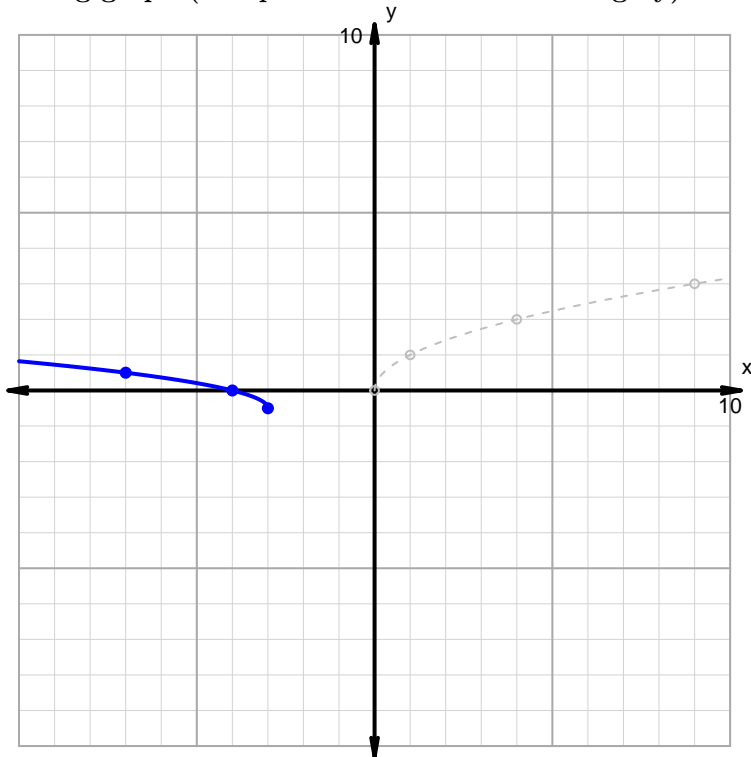
Horizontal transformations

1. Translate right by distance 3.
2. Horizontal reflection over y axis.

Vertical transformations

1. Translate down by distance 1.
2. Vertical shrink by factor 2.

Resulting graph (and parent function in dashed grey):



- What is the equation for the curve shown above?

Question 6 (20 points)

Make an accurate graph, and describe locations of features.

$$y = \frac{1}{3} \cdot |x + 5| - 1$$



| Feature | Where |
|------------|-------|
| Domain | |
| Range | |
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |